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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/664,066	09/16/2003	Jongill Hong	0941.68363	3251
24978	7590	12/27/2004	EXAMINER	
GREER, BURNS & CRAIN 300 S WACKER DR 25TH FLOOR CHICAGO, IL 60606			BERNATZ, KEVIN M	
			ART UNIT	PAPER NUMBER
			1773	

DATE MAILED: 12/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/664,066	<b>Applicant(s)</b> HONG ET AL.	
	<b>Examiner</b> Kevin M Bernatz	<b>Art Unit</b> 1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s), including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### ***Response to Amendment***

1. Amendments to claims 1 and 10, filed on October 8, 2004, have been entered in the above-identified application.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Examiner's Comments***

3. Regarding the limitation(s) "made of a metal which improves GMR performance" in claims 1 and 10, the Examiner has given the term(s) the broadest reasonable interpretation as stated in Paragraph 2 of the Office Action mailed July 8, 2004.
4. Regarding the limitation(s) "effective magnetic layer thickness, excluding a thickness of a magnetically dead layer" in claim 4, the Examiner has given the term(s) the broadest reasonable interpretation(s) consistent with the written description in applicants' specification as it would be interpreted by one of ordinary skill in the art. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Donaldson Co., Inc.*, 16 F.3d 1190, 1192-95, 29 USPQ2d 1845, 1848-50 (Fed. Cir. 1994). See MPEP 2111. Specifically, the Examiner has interpreted this to simply be the thickness of the individual layer since applicants' as-filed disclosure provides no guidance as to what is intended by the language "effective magnetic layer thickness,

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excluding a thickness of a magnetically dead layer". I.e. what is the meant by the terms "effective magnetic layer thickness" and "thickness of a magnetically dead layer"?

### ***Claim Objections***

5. Claim 3 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim for the reasons of record as set forth in Paragraph No. 5 of the Office Action mailed on July 8, 2004.

### ***Claim Rejections - 35 USC § 103***

6. Claims 1 – 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gill (U.S. Patent No. 6,181,534 B1).

Regarding claims 1, 3, 6 - 8 and 11 - 13, Gill discloses a magnetic storage apparatus for reading information from a magnetic recording medium (*Figures 1 – 7*), comprising a magnetoresistive spin-valve sensor (MR sensor) which reads information from the magnetic recording medium (*col. 1, lines 5 – 17*), said MR sensor comprising a magnetic layer (*Figure 9, layer 316*), a first specular layer made of a metal oxide (*layer 322*), a second specular layer (i.e. applicants' "back layer"), interposed between the magnetic layer and the specular layer (*Figure 9*), and a metal layer disposed adjacent to the specular layer, opposite to the back layer, and made of a metal which improves GMR performance of the MR sensor meeting applicants' claimed Markush limitations in claim 3 (*col. 8, line 51 bridging col. 9, line 13 – Ta cap*).

Gill fails to disclose using AuCu, AgCu or AuAgCu alloys for the back layer.

However, Gill teaches that the specular reflector layer SR1 can be formed of Cu, Au or Ag, including embodiments comprising multiple layers of these elements (*col. 8, lines 51 – 65 and Figures 17 and 18*) and that the disclosed invention clearly encompasses other embodiments and modifications which “occur readily to those of ordinary skill in the art in view of these teachings” (*col. 9, lines 14 – 16*). The Examiner deems that using alloys of the three elements listed as suitable by Gill is just such an embodiment or modification which would have been readily envisioned by one of ordinary skill in the art. The Examiner notes that applicants’ claims are open to the entire range of alloy compositions (“x denotes a fraction of Cu in the alloy greater than 0.0 and less than 1.0”).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant’s invention to modify the device of Gill to use AuCu, AgCu and AuAgCu alloys as the back layer since one of ordinary skill in the art would have readily envisioned such an embodiment given the teachings in Gill that suitable materials for the SR1 layer comprise Au, Ag and Cu.

Regarding claim 2, Gill discloses specular layers meeting applicants’ claimed Markush limitations (*Figure 9*).

Regarding claim 4, instead of relying upon layer 316 as the claimed “magnetic layer”, the Examiner notes that layer 312 can be the claimed “magnetic layer” while continuing to meet the rest of the claimed limitations. With the above “magnetic layer” Gill discloses magnetic layers having a thickness meeting applicants’ claimed limitations (*layer 312 – 24 Å*). See also layer 504 in *Figure 13*.

Regarding claim 5, Gill discloses back layers meeting applicants' claimed thickness limitations (*Figure 9 – layer 318*).

Regarding claim 9, Gill discloses a pinned and spacer magnetic layer (*layers 306 and 314*) meeting applicants' claimed structural limitations.

### ***Response to Arguments***

#### **7. The objection of claim 3 as failing to further limit claim 1**

Applicant(s) argue(s) that since claim 3 recites material not explicitly listed in claim 1, that claim 3 further limits claim 1 (*page 7 of response*). The examiner respectfully disagrees.

As stated in the objection of record, the Examiner notes that applicants as-filed disclosure is only enabling for the materials listed in claim 3 as metals “which improves GMR performance of the magnetoresistive spin-valve sensor”. Applicants are not enabled (and hence excluded from the scope of claim 1) for materials which were not envisioned by applicants as improving the GMR performance (*Ex parte Slob*, 157 USPQ 172, 1968). Since the scope of enablement of claim 1 is identical to the scope of enablement of claim 3, the Examiner maintains that the objection to claim 3 is proper.

#### **8. The comment regarding claim 4 – “effective magnetic layer thickness”**

The Examiner appreciates applicants noting where the language is used in the specification, however the Examiner is still unclear what is *meant* by the term “effective magnetic layer thickness”, especially with regard to the claimed structure of a single

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magnetic layer with no apparent “magnetically dead” or non-magnetic layers within (?) the magnetic layer. Since the Examiner does not deem that one of ordinary skill in the art would readily appreciate any difference between the “magnetic layer thickness” and the “effective magnetic layer thickness, excluding a thickness of a magnetically dead layer”, the Examiner maintains that the above language is only enabling for reciting a total thickness of the magnetic layer, excluding any non-magnetic material layers located therewithin.

**9. The rejection of claims 1 - 13 under 35 U.S.C § 103(a) – Gill**

Applicant(s) argue(s) that Gill fails to teach or suggest the use of the claimed alloy (*pages 8 – 9 of response*) and that even should Gill suggest the claimed alloy, applicants have demonstrated unexpected results using the claimed alloys (*page 9 of response*). The examiner respectfully disagrees.

Applicant(s) are reminded that the test for obviousness is not whether the claimed invention is expressly suggested in any one or all of the references, rather the test is what the teachings would have suggested to those of ordinary skill in the art. *Ex parte Martin* 215 USPQ 543, 544 (PO BdPatApp 1981). In the instant case, given that Gill discloses Cu, Au and Ag as suitable metals for the back layer, as well as multiple layers comprising different materials, the Examiner deems that one of ordinary skill in the art would readily appreciate that alloys of the above materials would clearly be capable of meeting the disclose use in the Gill invention.

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Regarding applicants' arguments of unexpected results, the Examiner notes that the relied upon sections in applicants' as-filed disclosure are unconvincing since they do not appear to support applicants' allegations. Specifically, Figures 5 and 6 appear to show an almost random effect of alloy concentration on GMR and DR, with pure Cu appearing to be just as good or better than some of the shown alloys (e.g. Au<sub>57.7</sub>Cu<sub>42.3</sub>).

### ***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Applicants' amendment resulted in embodiments not previously considered (i.e. deletion of "Au" and "Cu" from the list of alloys for the back layer) which necessitated the new grounds of rejection, and hence the finality of this action.

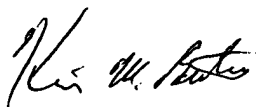


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11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kevin M. Bernatz, PhD.  
Primary Examiner

December 21, 2004